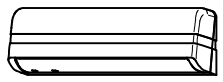
HR100-CT User Manual (Original)



EN

We would like to extend our thanks to you for purchasing this product. Before using this product, please read the following instructions carefully.
Please retain this manual for reference in case it needs to be referred to during the lifetime of this product.

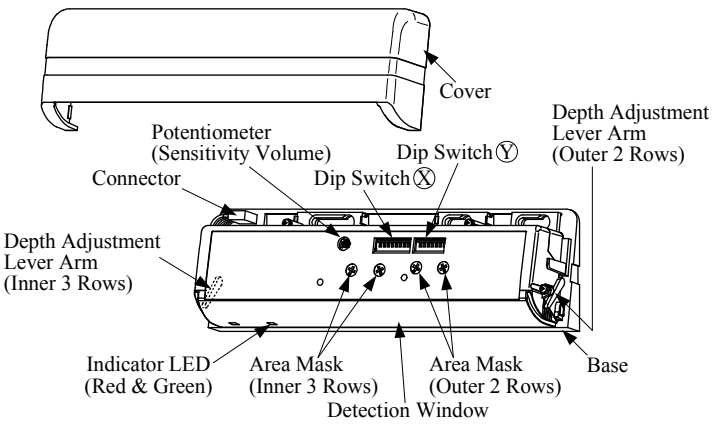
"Maximum Safety" due to the ability of HR100-CT to look back into the door close area without detecting door motion.
Minimum Building Energy losses due to pedestrian "Direction Detection" technology built into the HR100-CT sensor.
EC type-examination certificate registration No: 44 205 11 391027-001 valid from 2011.

WARNING This symbol indicates an extremely dangerous situation. If the user ignores this symbol then serious injury or death can result.

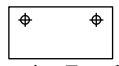
CAUTION This symbol indicates a dangerous situation. If the user ignores this symbol then injury or damage to equipment can result.

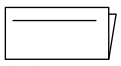
COMPLIED STANDARDS
DIN18650-1:2005
EN 12978:2003

1. Part Identification



Accessories


Mounting Template

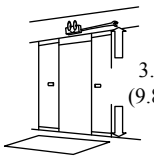

Installation Instruction

Cable

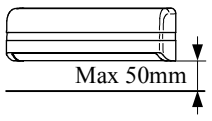
Mounting Screws (2 pcs.)

2. Mounting Caution

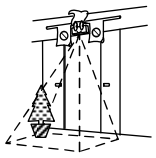
① Mount lower than 3.0m (9.84ft).



② Mount within 50 mm of the bottom of the door engine cover. If the unit is mounted higher, it cannot learn the door close area.

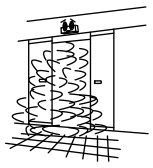


③ Ensure there are no moving objects in detection zone.



④ Ensure rain & snow do not fall on the sensor. (Use a weather cover if necessary)

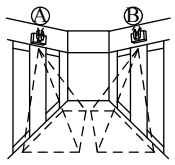
⑤ Ensure no condensation gets onto the sensor.



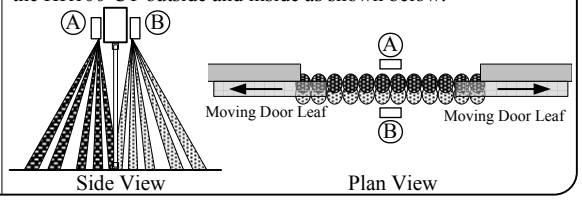
⑥ If possible ensure no accumulation of snow or water on the floor.

⑦ Ensure the minimum of reflected sunlight from the floor.

⑧ Use a different frequency settings for sensors in close proximity to each other as illustrated below.



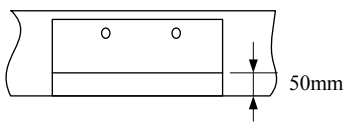
⑨ To maximize the effectiveness of doorway detection, install the HR100-CT outside and inside as shown below.

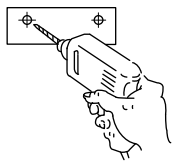


3. Mounting and Wiring Information

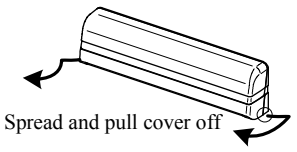
WARNING Drilling may cause Electric shock!
When drilling, pay attention to wires inside the door engine cover.

① Attach the mounting template so that its bottom edge is flush with the bottom edge of the door engine cover and drill mounting (3.5mmϕ) and wiring (10mmϕ) holes.

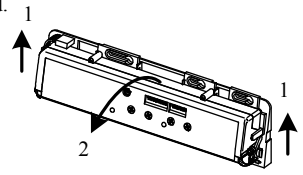




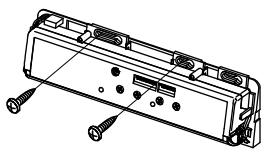
② Remove the sensor cover.



③ If you need to remove the sensor body from the base then lift the sensor body from the base and tilt it forward to remove as illustrated.

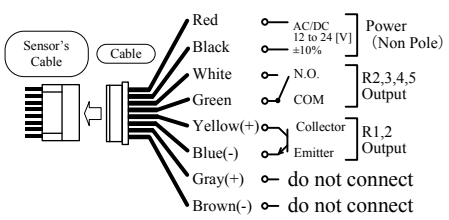


④ Attach the sensor with the mounting screws provided



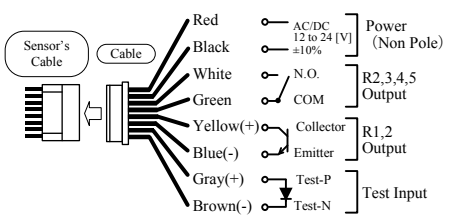
⑤ Connect Wires to the door controller.

WITHOUT a test input



Dip Switch Ⓨ
Test Input setting
High
4

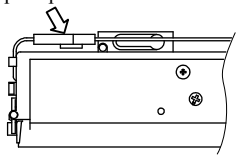
WITH a test input Connect "Test Input" wires to the door controller to comply with DIN18650.



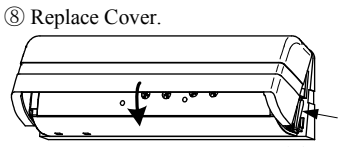
Dip Switch Ⓨ
Test Input setting
Low
4

⑥ Set Dip Switch, Lever Arms and Potentiometer settings as desired.
(See Section 4 and 5)

⑦ House connectors in the space provided.



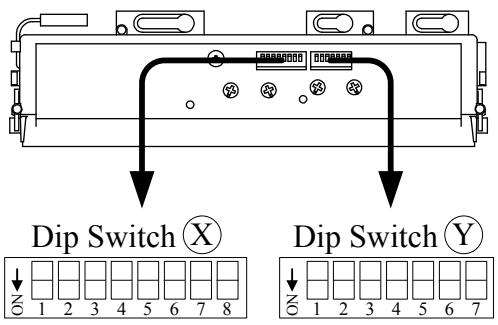
⑧ Replace Cover.



CAUTION Be careful not to inadvertantly move the Depth Adjustment Lever Arms when replacing the cover.

4. Dip Switch Settings

CAUTION Setting Mode: Before changing other dip switch settings, the setting mode dip switchⓎ-7 must be turned ON. When the "setting mode" dip switch is turn ON the relay will activate causing the door to remain open. Once all other dip switch settings are configured, dip switchⓎ-7 should be turned OFF.
When dip switch setting are changed an Orange LED blinks rapidly until the change takes effect, during this time period stay out of the detection area of the sensor.



Ⓧ Inner 3 Rows Presence Timer

2 S	
☆30S	
60S	
∞	

1 2

The sensor will detect a stationary object for the preset presence timer setting. If the object does not move during this preset time period, the door will close.

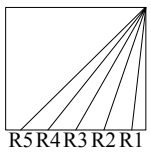
Set the timer to 60sec. or more to comply with DIN18650.

Ⓧ Quantity of Rows

☆ R5	
R4	
R3	
R2	

3 4

The number of rows of detection can be set to 5, 4, 3, 2 depending on detection area requirements.



Ⓧ Frequency

☆ A	
B	
C	
D	

5 6

When more than two sensors are installed in close proximity to each other select different frequency settings for each sensor to prevent interference.

Ⓧ Doorway Learn

☆	OFF	Doorway Learn OFF
	ON	Doorway Learn ON

7

Doorway Learn when turned ON allows the 1st row of detection to be focused back inside the door close area without the sensor detecting door movement. When Doorway Learn is OFF ensure that the first row of detection is focused directly in front but not inside the moving door leaves.

NOTE: When Doorway Learn is turned ON, the inner row of detection that is monitoring the closing door is only at maximum sensitivity when the outer rows of detection of the sensor are activated.

Ⓧ Doorway Sensitivity

☆	Normal	Only selectable when "Doorway Learn" above is turned "ON"
	OFF	

8

When "Doorway Sensitivity" is set to "OFF" once the door closes the sensitivity level on the inner most row of detection which is looking back into the door close zone goes to zero thus preventing unwanted or unauthorized door activations from the side of the door where the sensor is not installed.

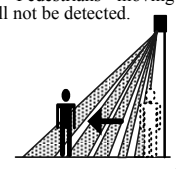
☆ Default Settings

Ⓨ Direction Detection

☆	OFF	Door hold open time and building energy losses can be reduced by turning ON "Direction Detection" recognition. Pedestrians moving away from the sensor will not be detected.
	ON	

1

NOTE: For pedestrian safety purposes when "Doorway Learn" is set to ON the 1st and 2nd row of detection will detect pedestrian regardless of direction.



Ⓨ Output Ⓐ setting (Door Safety)

☆	N.O.	Output logic can be set to N.O. or N.C. In the N.O. setting the opto-coupler is open when there is no detection and is driven when there is detection.
	N.C.	In the N.C. setting, the opto-coupler is driven when there is no detection and open when there is detection.

2

When the sensor power is OFF the opto-coupler defaults to the "Open" state.
Refer to [5.Timing Chart of events].

Ⓨ Output Ⓑ setting (Door Activation)

☆	N.O.	Output logic can be set to N.O. or N.C. In N.O. setting the mechanical relay is open when there is no detection and is closed when there is detection.
	N.C.	In the N.C. setting, the mechanical relay is closed when there is no detection and open when there is detection.

3

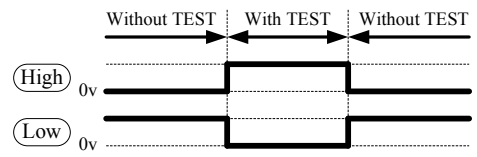
When the sensor power is OFF the mechanical relay defaults to the "Open" state.
Refer to [5.Timing Chart of events].

Ⓨ Test Input setting from Door Controller

☆	High	TEST input is the input signal from the door controller. The TEST input signal from the door controller that the sensor can recognize can be set to "High" or "Low". When connected to a door controller without a TEST input set to "High". when connected to a door controller with a TEST input set to "Low"
	Low	

4

Refer to [5.Timing Chart of events].



Set to "Low" to comply with DIN18650.

Ⓨ Reflection Diagnostics

☆	Normal	In some instances the reflection from the floor can be very low, the HR100-CT can sometimes judge this as an error state with the dip switch set to "Normal" (OFF). This low reflection state will be indicated by an alternate slow flashing Red/Green LED. To ignore this low reflection error state, set this dip switch to "Low Reflection"(ON). Refer to [9. Sensor Self Diagnostics Error].
	Low Ref.	

5

NOTE: Set to "Low Reflection" during maintenance work on the door controller.
Refer to [10. Sensor Settings for Door Maintenance Work].

Set to "Normal" to comply with DIN18650.

Ⓨ Monitor Mode

☆	Normal	Snow Mode should only be used in environments where heavy snowfall or other extreme conditions exist.
	Snow	

6

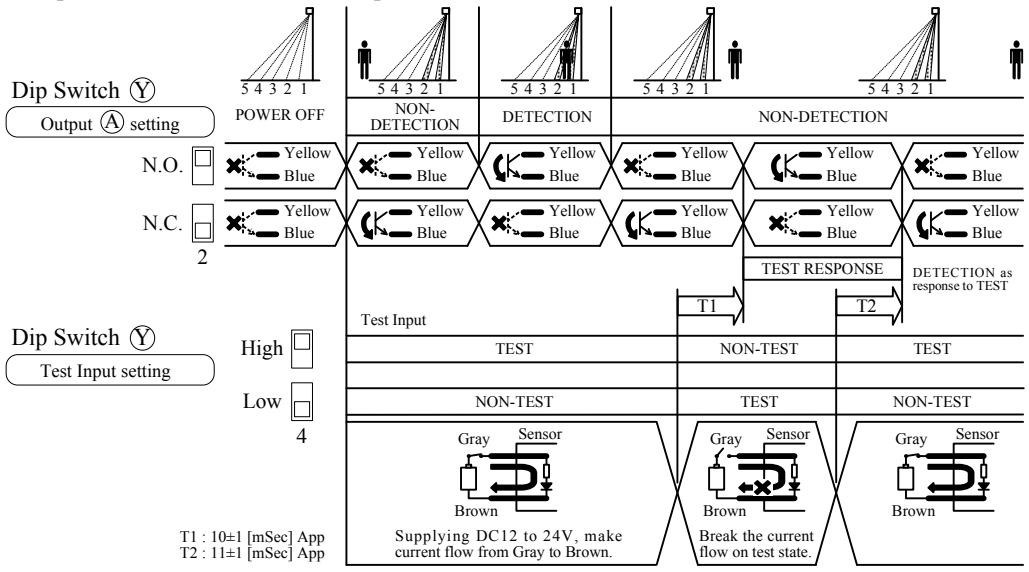
Ⓨ Setting Mode

☆	OFF	Turn ON to configure all other dip switch settings. When ON the sensor will output a detection signal and the LED will be Dark Red. **NOTE:** Refer to the caution in [4.Dip Switch Settings]
	ON	

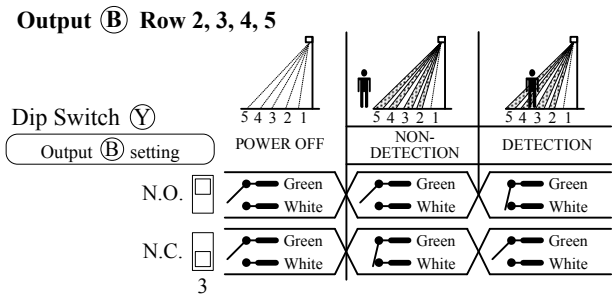
7

5. Timing Chart of events

Output Ⓐ Row 1, 2 / Test Input



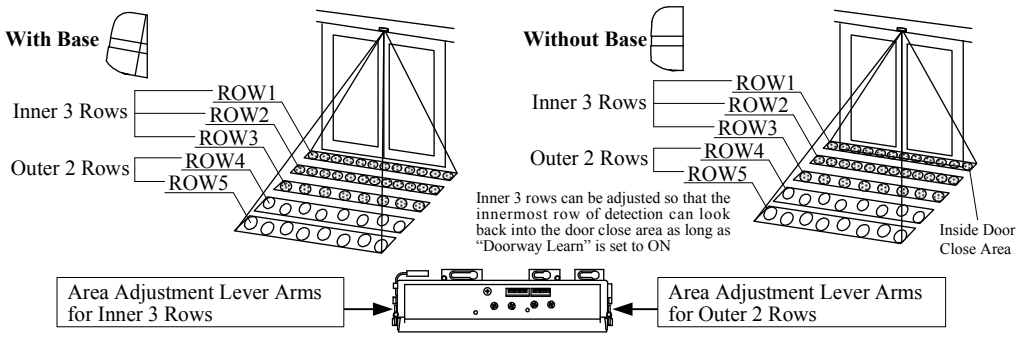
Output Ⓑ Row 2, 3, 4, 5



6. Adjusting the Infrared Detection Area

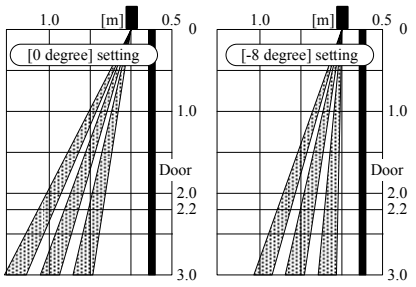
6-1 Adjusting the outer 2 rows and inner 3 rows of Detection:

The detection distance from the door for the inner 3 rows and outer 2 rows of detection can be adjusted seperately using the lever arms on the left and right hand side of the sensor as illustrated below.

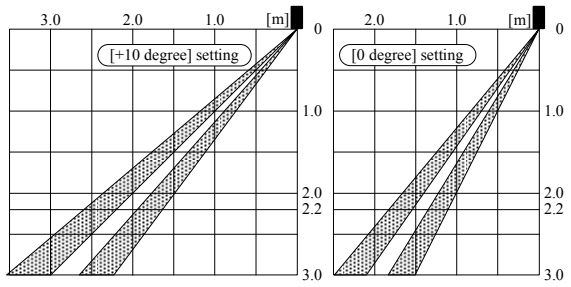


With Base

Area Adjusting Lever Arms for Inner 3 Rows

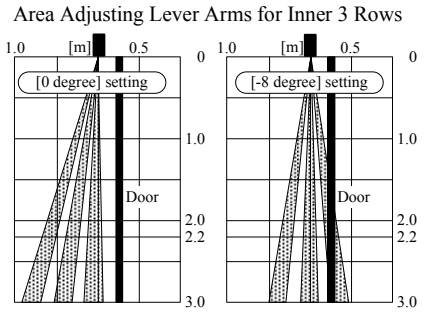


Area Adjusting Lever Arms for Outer 2 Rows

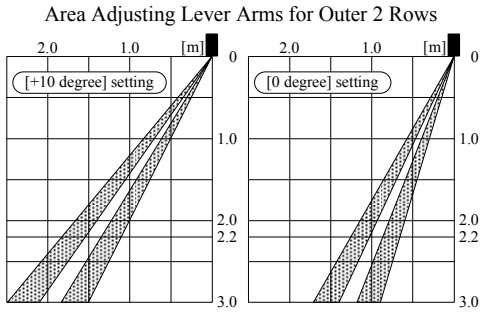


Without Base

Area Adjusting Lever Arms for Inner 3 Rows

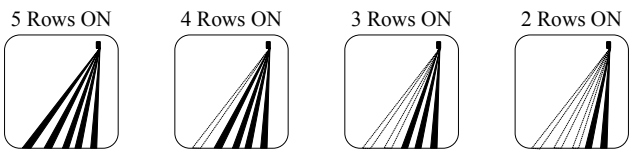


Area Adjusting Lever Arms for Outer 2 Rows



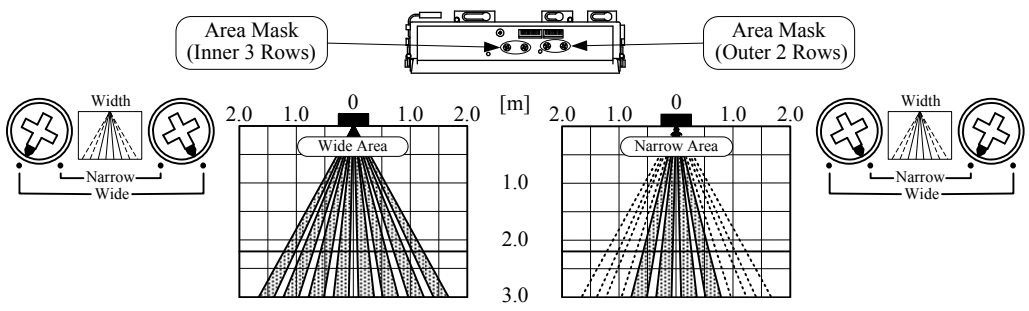
6-2 Deleting rows of detection:

Using the "Quantity of Rows" dip switch, detection rows 5,4 and 3 can be turned ON or OFF [See Section 4.Dip Switch Setting]



6-3 Detection Area Width Adjustment :

Detection Area Width Settings for outer 2 rows and inner 3 rows of detection can be incrementally adjusted by turning the Area Masks using a screw driver etc as illustrated below.



CAUTION

The above illustrated detection areas represent the actual position of the infrared beams. The actual detection area observed will vary depending on the sensor installation environment, object been detected and sensor settings. Please ensure that the detection area is set to conform to DIN18650.

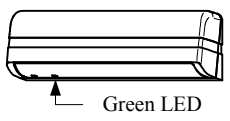
7. Applying Power & Initializing if Doorway Learn is "ON"

CAUTION

If "Doorway Learn" is set to "ON" read the below instructions before applying power in order to understand the procedure involved in getting the inner most row of detection to learn the door close zone.

7-1 Doorway Initialisation:

Doorway initialization is the procedure that needs to be carried out so that the inner most row of detection can "learn" door movement.
When doorway "learning" is being carried out the Green LED blinks. When the doorway "learn" procedure has been successfully completed the Green LED stops blinking.

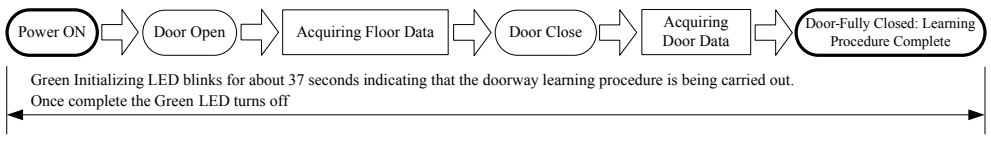


7-2 Doorway Learn Procedure:

First ensure that the "Doorway Learn" dip switch is set to "ON" and keep out of the detection area of the sensor

(1) **Doorway Learn Procedure:** The below procedure is carried out each time power is turned ON. The sensor will automatically send an output signal to the door controller triggering the door open/close cycle thus initiating the "doorway learn" process .

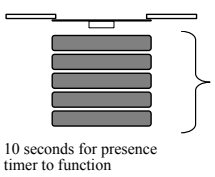
NOTE: During the doorway learn procedure, the doorway detection row (inner most row) can detect motion only while all other rows can detect presence (While doorway learn is being carried out the second row of detection maintains presence detection and protects pedestrians from dangerous door closures).


Power ON
Door Open
Acquiring Floor Data
Door Close
Acquiring Door Data
Door-Fully Closed: Learning Procedure Complete
Green Initializing LED blinks for about 37 seconds indicating that the doorway learning procedure is being carried out.
Once complete the Green LED turns off

(2) **Doorway Learn Failure and Recovery:** During the doorway learn process if a person enters the detection area the doorway learn process may not be successfully carried out. In this case the HR100-CT sensor will carry out the doorway learn process over three door activations by a person in order to build an accurate image of the door open and door close position. Again in this case all other rows of detection will go to presence detection immediately with the second row of detection maintaining safety in front of the door close zone.

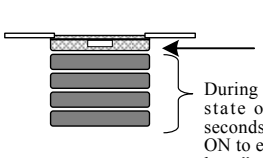
7-3 How Presence Detection is Initiated after Sensor Power Up

"Doorway Learn" dip switch set to OFF



It takes 10 seconds after sensor power up for presence detection to be initiated on all rows of detection.
If before 10 seconds have elapsed someone walks into the detection area it will take about 5 seconds after the person leaves the detection zone for presence detection to be functional.

"Doorway Learn" dip switch set to ON



It will take the 1st row of detection 37 seconds to "learn" the door open and close position.

During this time rows 2 to 5 go to a state of presence detection 10 seconds after the sensor is powered ON to ensure safety while the "door learn" procedure is being carried out

7-4 General Caution:

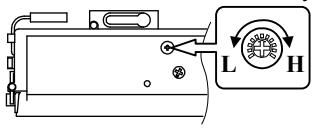
When carrying out the following work, turn off sensor power.

※ When the floor condition is changed by placing a mat on the floor etc.
※ When the detection area pattern or sensor sensitivity is adjusted.

8. Verification of Operation

1. After installation is completed, verify the infrared detection area.
2. If the doors do not move as expected, readjust the infrared detection area.
3. If the doors do not move as expected after the above procedure then adjust the sensitivity.

How to adjust the sensitivity



(1) When the sensor does not detect objects in the detection area the sensor sensitivity can be increased by turning the potentiometer clockwise
(2) When the sensor detects even though there is nothing in the detection area then the sensor sensitivity can be decreased by turning the potentiometer in the anti-clockwise direction

NOTE: To achieve detection of the CA test body in accordance with DIN18650 please set the sensor sensitivity to the highest setting. If the "doorway learn" is turned ON and the 1st row of detection is monitoring the doorway ensure that the 2nd row of detection can detect the CA body.

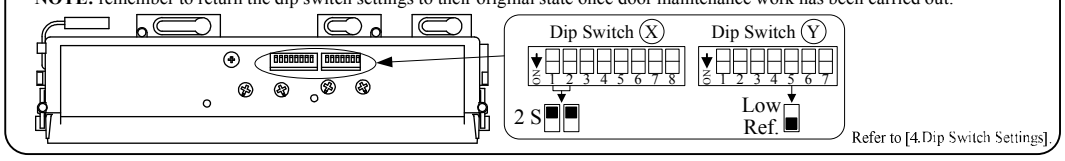
9. Sensor Self Diagnostics Error

Sensor self diagnostics failure is indicated by a Green/Red LED flashing. The speed of the LED flash indicates the type of error that has occurred.

LED		Cause	Solution
Fast Flashing	Green / Red	Internal error	Please replace the sensor.
Slow Flashing	Green / Red	Low reflection level	Confirm that the sensitivity potentiometer is set to maximum, and then reactivate the sensor. If the error continues, set Dip Switch Ⓨ -5 to "Low Reflection" . Refer to [4. Dip Switch Settings].

10. Sensor Settings for Door Maintenance Work

When carrying out door maintenance work with power applied to the sensor please set the dip switches as below.
NOTE: remember to return the dip switch settings to their original state once door maintenance work has been carried out.



Refer to [4.Dip Switch Settings].

11. Trouble shooting

Problems	Cause	Solution
Door does not operate.	Sensor Connector	Tighten connector or reconnect.
	Power Supply	Apply proper voltage to the sensor. (AC/DC 12-24V)
Door operates Intermittently.	Sensor is very dusty or covered with water drops etc.	Clean the sensor. (Do not use thinner or alcohol.)
	Detection sensitivity to low.	Increase sensitivity by turning clockwise.
	Incorrect detection pattern setting.	Set the correct detection patterns to suit the installation environment.
Door opens & closes Repeatedly. (Sensor detects door.)	detection row "ROW1" ("ROW2" when doorway learning is turned ON) is focused too close to the door.	Adjust detection depth for Inner 3 rows away from the door.
Door operates by itself.	Moving object in the detection area.	Remove the moving object from detection area.
	Outer 2 Rows are set too far from the door	Reduce the detection distance of the sensor using the area adjustment lever, the detection area mask or the quantity of rows dip switch so as not to detect passing people.
	Sensitivity too high.	Turn down the sensitivity.
	Another sensor is installed close by.	Ensure different frequency setting for each sensor.
	Presence detection area changes suddenly. I.e. Dusty / Dirty / Snow, mat laid on floor etc.	This may cause the door to remain open. Reduce the presence timer setting to ensure shorter door hold open times.

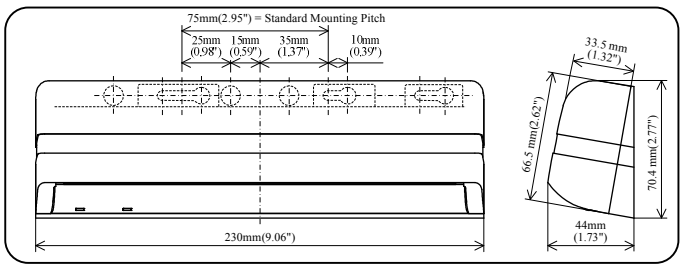
12. Technical Data

Model Name	HR100-CT Motion and Presence Sensor			
Detection Method	Active Infrared Reflective Detection			
Installation Height	3.0[m] (9.84 [ft]) Max			
Depth Detection Adjustment	Depth Adj. Lever	Outer 2 rows 10 [deg.] Inner 3 rows 8 [deg.]		
	Dip SW.	Total Detection Rows 5,4,3 or 2		
Sensitivity Adjustment	By Potentiometer			
Width Detection Adjustment	Outer 2 Rows	Area Mask	For Narrow or Wide	
	Inner 3 Rows	Area Mask	For Single or Double Door	
Noise Prevention	Dip SW.	Normal or Snow Mode		
Cross Interference	Dip SW.	One of 4 frequencies		
Output Holding Time	0.5 [seconds] App.			
Response Time	0.1 ～ 0.2 [seconds]			
Presence Timer	Outer 2 Rows	1 [seconds]		
	Inner 3 Rows	Dip SW.	2,30,60 [seconds] or ∞	
Doorway Learn	Dip SW.	OFF or ON		
Doorway Sensitivity	Dip SW.	Normal or OFF		
Direction Detection	Dip SW.	OFF or ON		
Setting Mode	Dip SW.	OFF or ON		
Power Supply	AC/DC 12 to 24 [V] ±10% 50/60Hz Red : Black			
Power Consumption	AC12V-2.1 [VA] (Max) , AC24V-2.1 [VA] (Max) DC12V-110 [mA] (Max) , DC24V-60 [mA] (Max)			
LED Indication	Green – Standby Green blinking – Doorway Learning Red – Detecting Orange – Detection row "ROW1"("ROW2" when doorway learning is turned ON) is focused too close to the door. Orange blinking – Dip switch setting are changed. Green/Red blinks alternately – Internal Sensor Error Dark Red – Setting Mode			

Output	ROW 1,2	Open collector 7.5 [mA] (Max) Resistor Load		
		Yellow : Collector Blue : Emitter	Output Ⓐ setting	2 N.O. Normally Open Drive on Detection
				2 N.C. Normally Drive Open on Detection
		Opto coupler(NPN) Voltage : 55 [VDC] Max. Current : 50 [mA] Max. Dark Current : 100 [nA] Max. (Resistance load)		
	ROW 2,3,4,5	Form A Relay DC50 [V] 0.1[A] Resistor Load		
		White : N.O. Green : COM	Output Ⓑ setting	3 N.O. Normally Open Closed on Detection
				3 N.C. Normally Closed Open on Detection
Test Input		Gray : Test-P Brown : Test-N	Test Input setting	4 High Non-Test : Open Test : DC12 to 24 V
				4 Low Non-Test : DC12 to 24 V Test : Open
		6 [mA] Max. @ 24 [VDC]		
Operating Temperature	-20 to +60 [Deg.C],(-4 to 140 Deg.F)			
Operating humidity	Below 80%			
IP Rate	IP54 (With Base)			
Category	2 , performance level D for presence detection according to EN ISO 13849-1:2008			
Weight	0.55 [lb.] (0.25 [kg])			
Color	Black, Silver			
Accessories	Cable , Mounting Screw 2pcs., Mounting Template, Installation Instruction			

Notice: Specification may be changed without prior notice.

13. Dimensions



<Disclaimer> The manufacturer cannot be held responsible for below.
1. Misinterpretation of the installation instructions, miss connection, negligence, sensor modification and inappropriate installation.
2. Damage caused by inappropriate transportation.
3. Accidents or damages caused by fire, pollution, abnormal voltage, earthquake, thunderstorm, wind, floods and other acts of providence.
4. Losses of business profits, business interruptions, business information losses and other financial losses caused by using the sensor or malfunction of the sensor.
5. Amount of compensation beyond selling price in all cases.

HR100-CT EC DECLARATION OF CONFORMITY

We Hotron declare that this sensor complies with all of the applicable EHSRs of Annex I of the Machinery Directive and that the appropriate conformity assessment procedure has been carried out.

Compiler of Technical File (EC Community)
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Description of Product:
HR100-CT Combined motion and presence detection sensor for the activation and safety of automatic doors.
Technology used is Active Infrared Technology

Above EC Type Directives Certified by:
TUV NORD CERT GmbH
30519 Hannover, Germany
Identification No: 0044

Directives Fulfilled:
DIRECTIVE 2006/42/EC
DIN 18650-1:2005 Powered pedestrian doors Part 1: Product requirements chapter 5.7.4
EN12978:2003 Industrial, commercial and garage doors and gates - safety devices for power operated doors and gates - Requirements and test methods
EN62061:2005 Functional safety of electrical/electronic/programmable electronic safety-related systems
EN ISO 13849-1:2008 Safety of machinery - Safety-related parts of control systems.

Harmonised Standards Used:
EN ISO 13849-1:2008

Other Technical Standards Used:
DIN 18650-1:2005

Declaration made by
Kaoru Musya General Manager

Date ??th ???? 2011

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